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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## *Office Action Summary*	**Application No.** 10/679,312	**Applicant(s)** MOON ET AL.
	Examiner Sangwoo Ahn	**Art Unit** 2166

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2007*.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22 and 34-54* is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-22 and 34-54* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a)☐ All b)☐ Some * c)☐ None of:
  1.☐ Certified copies of the priority documents have been received.
  2.☐ Certified copies of the priority documents have been received in Application No. _____.
  3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *See Continuation Sheet*.

Continuation of Attachment(s) 6). Other: Documents that prove Burden reference has been publicly available from Jan 17, 1999.

DETAILED ACTION

Election/Restrictions

Applicant's argument regarding the Election/Restrictions requirements have been fully considered and are persuasive. Therefore, Election/Restrictions requirements have been withdrawn.

Response to Amendment

Claims 1 – 22 and 34 – 54 are pending in this Office Action.

Claims 1, 12, 34 and 45 have been amended.

Claims 51 – 54 have been added.

Claims 23 – 33 have been canceled.

Response to Arguments

In response to Applicant's argument that there is no evidence on the face of the "Burden" document that establishes it was publicly available on "08/14/2002," Examiner provides evidence that the "Burden" document was in fact publicly available as early as Jan 17, 1999. The Wayback Machine available on www.archive.org provides archived versions of the "Burden" document, which dates back to Jan 17, 1999. The exact document could be found on Prof. Peter Burden's school homepage on Jan 17, 1999. Aforementioned evidence is attached to this Office Action.

The claim objections made in the previous Office Action have been withdrawn. However, Examiner would like to note that the language "configured for" does not guarantee an outcome.

Regarding the 102 rejection of claim 45, Applicant mainly argued that Sibley does not disclose or suggest, "determining a movement directive based on an optimization of routing metrics relative to the received detected attribute information." Examiner respectfully traverses the argument. Sibley clearly discloses or suggests the aforementioned feature in page 1147, section IV Enabling Novel Research ¶ 4: "determining a movement directive (autonomously *moves nodes to locations*) based on an optimization of routing metrics (moves nodes to locations ... to *improve throughput* along a multi-hop transmission path) relative to the received detected attribute information (actively moves nodes in order to maximize some *characteristic*)." It is also noted that much of the Applicant's arguments purported to distinguish the present invention over the prior art *relies on the features not recited in the claim* (Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993)), and the claims are written in such a broad way that they fail to differ from the Sibley reference in the Examiner's view.

Regarding the 103 rejection of claim 1, Applicant mainly argued:

- Burden does not disclose or suggest "the world object database including smart world objects as a subclass of the world objects and configured for generating decisions based on evaluation of selected world objects."

- Burden does not disclose or suggest "sensor objects from sensor data generated in response to detected attributes within the infosphere."

Examiner respectfully traverses the arguments for the following reasons;

- Burden clearly discloses or suggests in page 3 (under Internet Routing - Internal Routing Tables) "the world object database (Internal Routing Tables) including smart world objects (the individual fields of each entry/row) as a subclass of the world objects (each entry/row in the table) and configured for generating decisions (routing) based on evaluation of selected world objects (the system is "evaluating" the table for effective routing)."

- Burden clearly discloses or suggests in page 6 (under The OSPF (RFC 1247) Protocol, bullet 2 – Database Description Packets) "sensor objects from sensor data generated in response to detected attributes within the infosphere (link state and link status information records)." In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the *features upon which applicant relies* (i.e., the sensor data must be derived from *a physical sensor*) *are not recited in the rejected claim(s)*. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's arguments against the references individually (i.e., the assertion that an obstacle can be a teaching of a world object that specifies directive based on one of the decisions generated by a smart world object is without foundation and unreasonable), *one cannot show nonobviousness by attacking references* *individually where the rejections are based on combinations of references.* See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In addition, the Sibley reference clearly suggests the motivation that would make the combination of Burden and Sibley perfectly reasonable, in saying "ad-hoc network [is] an autonomous system of mobile routers ... [which] may be connected to the larger internet" (page 1147) and "The Robomote makes the network topology dynamic, and thus truly ad-hoc ... consider using Robomote as a test bed for ad-hoc routing protocols" (page 1147). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to *integrate the routing methods as described by Burden and used in the internet within Sibley's Robomote's router component*.

For the foregoing reasons, 102 and 103 rejections are sustained.

Information Disclosure Statement

Applicants' Information Disclosure Statements, filed on 1/7/2004 & 9/7/2005 have been received, entered into the record, and considered. See attached PTO-1449 forms. The non-Patent literature references titled "Mobility Support in Ipv6" and "OMG Unified Modeling Language Specification" were only given cursory consideration due to the applicant's failure to provide the examiner with a statement of **which parts of these excessively long documents contain pertinent material (currently filed IDS on 7/14/2006 identifies all pages of the non-patent literature references as pertinent)** as required by 37 CFR 1.98(b)(5) which states, "Each publication listed in an information disclosure statement must be identified by publisher, author (if any), title, **relevant pages of the publication**, date, and place of publication." (emphasis added).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 46 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "wherein the receiving includes one of:" on line 1 of claim 46 when followed by "receiving sensor information from the mobility platform and indicating the physical attribute; and receiving the detected attribute information ..." does not provide a clear view of what the modifier "one of" is referring to.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 45-54 are rejected under 35 U.S.C. 102(b) as being anticipated by *"Robomote: A Tiny Mobile Robot Platform for Large-Scale Ad-hoc Sensor Networks"* (henceforth referred to as Sibley et al.).

Sibley et al. anticipate Claim 45 as follows: **A method for controlling a network node in a network, the method comprising: receiving detected attribute information that indicates a detected attribute relative to any one of the network node and the network, the detected attribute including any one of a communication attribute and a physical attribute** (page 1147, section IV Enabling Novel Research, ¶ 4); **determining a movement directive based on an optimization of routing metrics relative to the received detected attribute information** (page 1147, section IV Enabling Novel Research, ¶ 4); **and sending the movement directive to a mobility platform associated with the network node, the movement directive causing the mobility platform to implement the optimization by implementing a physical change for the network node** (page 1147, section IV Enabling Novel Research, ¶ 4; & page 1144, section II-C Functionality, ¶ 2).

Sibley et al. anticipate claim 46 as in claim 45, **wherein the receiving includes one of: receiving sensor information from the mobility platform and indicating the physical attribute; and receiving the detected attribute information from a second network node in the network via a wireless communications link** (page 1147, section IV Enabling Novel Research, ¶ 5, In order for a swarm of autonomous mobile network nodes to function as a swarm each node must be aware of at least the location of the surrounding nodes).

Sibley et al. anticipate claim 47 as in claim 45, **wherein the physical change caused by the mobility platform includes changing any one of a position of the**

network node, velocity of the network node, and network interface utilization in the network node (page 1147, section IV Enabling Novel Research, ¶ 4).

Sibley et al. anticipate claim 48 as follows: **A network node of a network, the network node comprising: an executable resource configured for determining a movement directive based on an optimization of routing metrics relative to received network attribute information, the received network attribute information indicating a detected attribute relative to any one of a the network node and the network, the detected attribute including any one of a communication attribute and a physical attribute** (page 1147, section IV Enabling Novel Research, ¶ 4); **and a mobility platform configured for implementing the optimization by causing a physical change for the network node in response to the movement directive** (page 1146, section III-A Hardware, ¶ 10; & page 1144, section II-C Functionality, ¶ 2).

Sibley et al. anticipate claim 49 as in claim 48**, wherein the mobility platform includes sensors configured for generating sensor information, the mobility platform providing the sensor information to the executable resource as the received network attribute information** (page 1145, section III-A Hardware, ¶ 4-5).

Sibley et al. anticipate claim 50 as in claim 48, **wherein the physical change caused by the mobility platform includes changing any one of a position, velocity, and network interface utilization in the network node** (page 1147, section IV Enabling Novel Research, ¶ 4).

Sibley et al. anticipate claim 51 as in claim 45, **wherein the determining includes determining the movement directive based one executing the**

optimization of routing metrics according to a prescribed routing protocol (page 1147, section IV Enabling Novel Research, ¶ 4).

Sibley et al. anticipate claim 52 as in claim 51, **further comprising sending an update to another node in the network that identifies the movement directive determined by the network node** (page 1147, section IV Enabling Novel Research, ¶ 4; & page 1144, section II-C Functionality, ¶ 2).

Sibley et al. anticipate claim 53 as in claim 48, **wherein the executable soruce is configured for determining the movement directive based one executing the optimization of routing metrics according to a prescribed routing protocol** (page 1147, section IV Enabling Novel Research, ¶ 4).

Sibley et al. anticipate claim 54 as in claim 53, **wherein the executable resource is configured for generating an update that is output by the network node to another node in the network, the update identifying the movement directive determined by the executable resource** (page 1147, section IV Enabling Novel Research, ¶ 4; & page 1144, section II-C Functionality, ¶ 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-22 and 34-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of "*Routing in the Internet*" (henceforth referred to as Burden) and Sibley et al.

Claim 1 is taught by Burden as follows: **A method in a network node, the method comprising: establishing within the network node a world object database that stores world objects, the world objects representing respective attributes of an infosphere of a network that includes the network node, the world object database including smart world objects as a subclass of the world objects and configured for generating decisions based on evaluation of selected world objects** (Burden: page 3, section Internet Routing – Internal Routing Tables, ¶ 1); **adding, as world objects to the world object database, sensor objects from sensor data generated in response to detected attributes within the infosphere, the sensor objects including network node objects associated with the network node** (Burden: page 6, section The OSPF (RFC 1247) Protocol, bullet 2 – Database description Packets); **forming the network based on: discovery of other network nodes, adding second network node objects as world objects to the world object database and representing attributes of the other network nodes, and sharing the world objects with the other network nodes** (Burden: page 5, section Communication Between Routers, ¶ 3).

However, Burden does not explicitly indicate **performing a change in at least one of position, velocity, orientation, and wireless communication characteristics of the network node based on detecting a world object specifying a directive**

based on at least one of the decisions. Yet, Sibley et al. teaches **performing a change in at least one of position, velocity, orientation, and wireless communication characteristics of the network node based on detecting a world object specifying a directive based on at least one of the decisions** (Sibley et al.: page 1144, section II-C Functionality, ¶ 2, any functional implementation of obstacle avoidance entails performing changes based on detecting obstacles (objects) and changing the travel path in order to avoid the identified obstacle).

One of ordinary skill in the art at the time of invention would have known to combine the routing methods described by Burden within the Robomote network node of Sibley et al. because Sibley et al. states that an "ad-hoc network [is] an autonomous system of mobile routers...[which] may be connected to the larger internet." (page 1147, section IV Enabling Novel Research, ¶ 2) Sibley et al. then goes on to state, "The Robomote makes the network topology dynamic, and thus truly ad-hoc... consider using Robomote as a test bed for ad-hoc routing protocols" (page 1147, section IV Enabling Novel Research, ¶ 3). Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to integrate the routing methods as described by Burden and used in the Internet within Sibley et al.'s Robomote's router component.

Claim 2 is taught by the combination of Burden and Sibley et al. as in claim 1, **wherein the sharing of the world objects includes receiving remote world objects from the other network nodes, and storing the remote world objects as world objects in the world object database** (Burden: page 6, section The OSPF (RFC 1247) Protocol, bullet 2 – Database description Packets).

Claim 3 is taught by the combination of Burden and Sibley et al. as in claim 1, **wherein the forming step includes discovering the other network nodes based on a mobile Internet Protocol (IP), and sharing the world objects according to the mobile IP** (Burden: page 6, section The OSPF (RFC 1247) Protocol, ¶ 2).

Claim 4 is taught by the combination of Burden and Sibley et al. as in claim 1, **wherein the establishing step includes instantiating execution of a world factory process configured for initializing the world object database and adding/removing the world objects to/from the world object database** (Burden: page 1, section Physical Address Determination, ¶ 2, the process which instantiates the routing table is the ARP).

Claim 5 is taught by the combination of Burden and Sibley et al. as in claim 4, **wherein the adding and performing steps are executed based on instantiating execution of a robot factory process configured for generating, for each smart world object, a corresponding robot object as one of the world objects, the adding step executed by a sensor process in at least one robot object and the performing step executed by a motor complex process in at least one robot object** (Sibley et al.: page 1145, section III-A Hardware, ¶ 1, each mote, network node, is coupled with a "robot" component).

Claim 6 is taught by the combination of Burden and Sibley et al. as in claim 5, **wherein the smart world objects own respective brain objects configured for generating the decisions, each brain object owning associated reaction objects configured for generating respective advice elements from associated world**

objects, each brain object configured for: determining the corresponding decision based on the associated advice elements relative to respective influence factors, and storing the decision as a vector object (Burden: page 3, section Internet Routing – Internal Routing Tables, ¶ 2 & 6, the examiner interprets the brain object as the decision making device in a router, usually a small microprocessor or an ASIC, in light of the definitions in the specification a router receiving a packet and deciding where to send it meets all limitations of this claim).

Claim 7 is taught by the combination of Burden and Sibley et al. as in claim 6, **wherein the performing step includes sending a directive by the motor complex process to a mobility platform in the network node in an attempt to implement the vector object** (Sibley et al.: page 1147, section III-B Software, ¶ 5; & Sibley et al.: page 1144, section II-C Functionality, ¶ 2).

Claim 8 is taught by the combination of Burden and Sibley et al. as in claim 5, **wherein each world object owns an associated three-dimensional shape object, the adding step including generating a request, by one of the robot objects, to the world factory for generation of an obstacle object in response to the sensor process detecting an obstacle in the infosphere** (Sibley et al.: page 1147, section III-B Software, ¶ 4).

Claim 9 is taught by the combination of Burden and Sibley et al. as in claim 4, **wherein the establishing step includes adding world domains as a subclass of the world objects, each world domain configured for: (1) owning at least one world object** (Burden: page 4, section Internet Routing – Internal Routing Tables, ¶ 13

& 14), **(2) having a native vector space** (Burden: page 4, section Internet Routing – Internal Routing Tables, ¶ 13 & 14, the network mask or subnet mask is the native vector space of a host), **(3) encompassing a location object specified in the corresponding native vector space** (Burden: page 4, section Internet Routing – Internal Routing Tables, ¶ 13 & 14, the host IP is a location within the subnet vector space), **and (4) having a transformational matrix configured for mapping the corresponding native vector space to other vector spaces used in the world object database, each world object configured for owning an associated three-dimensional shape object** (Burden: page 4, Internet Routing – Internal Routing Tables, ¶ 6).

Claim 10 is taught by the combination of Burden and Sibley et al. as in claim 9, **wherein the establishing step further includes adding waypoints as a subclass of the world objects, each waypoint representing an attribute relative to one of the vector spaces of the world object database** (Burden: page 1, Physical Address Determination, ¶ 1, in light of the specification of the instant application on page 12, a waypoint can be another computer or router).

Claim 11 is taught by the combination of Burden and Sibley et al. as in claim 10, **wherein the establishing step further includes nesting a group of the world domains, each identifiable as child world domains, within at least one of the world domains identifiable as a parent world domain, the child world domains inheriting the attributes of the associated parent world domain** (Burden: page 2, Physical Address Determination, ¶ 9).

Claims 12-22, 23-33 & 34-44 are taught by the combination of Burden and Sibley et al. using the same rationale as applied to claims 1-11.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sangwoo Ahn whose telephone number is (571) 272-5626. The examiner can normally be reached on M-F 10-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain Alam can be reached on (571) 272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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